



Learning **WITH** Others

Collaborative Learning

What is it?

Collaborative learning refers to a group of instructional practices that require students to work together to accomplish a task that is designed to lead to learning. Collaborative learning can be implemented on a small, short-term scale (e.g., groups of 2-4 students completing an activity in a single class) or a large, longer-term scale (e.g., an entire class working throughout the semester on a large design project). A key to successfully implementing collaborative learning is to structure the task so that students must interact and combine their efforts in order to accomplish the learning task: even if students are instructed to collaborate, a task that can be completed individually will be ineffective in inducing *collaborative* learning and may additionally create frustration (e.g., “I could do this faster on my own!”). One way to structure collaboration is by specifying different roles that must adopt to carry out the task, such as with the alternating roles of “teacher” and “learner” in reciprocal learning. Alternatively, collaboration can be made more likely by requiring that each individual’s contribution to the group’s work be documented.

Why should I use it?

A primary reason to use collaborative learning is because it can lead to increased learning. Relative to individual learning activities, collaborative learning activities have been shown to lead to better performance on tests of more advanced types of learning (i.e., “analysis” and “evaluation” levels of Bloom’s taxonomy). It is believed that the free exchange of ideas and the introduction of challenges to one’s thinking (e.g., “Why do you think that?”) lead to students to think more deeply about the material than they would on their own. Another reason to use collaborative learning is that collaboration is a reality of the 21st century workplace, and it gives students the opportunity to build and practice the collaborative skills they will need to be successful in their careers. Finally, because collaborative learning involves the joint efforts of multiple students, “bigger” challenges and tasks can be assigned. The distribution of work across multiple group members can make it possible to assign classroom learning activities more similar to engineering challenges students will face in their careers.

How do I implement it in my engineering course?

- Design learning activities that require each student to contribute and that invite interaction and a shared generation of ideas.
- Clearly define the expectations for the final product (e.g., a design sketch and a costs/benefits list) and for students’ contributions (e.g., “After everyone has generated a

design possibility, share with your group and work together to outline the costs and benefits for each design.”).

- Incentives (e.g., grades) should be structured so that everyone has to work toward the goal and no student can “get by” without learning or contributing to the group’s output.
- Give students guidelines for *how* to work together, including expectations for how students will interact and how work ought to be distributed. Collaboration and academic teamwork are not innate skills, and students who haven’t been taught how to work cooperatively with classmates might not know how to do it effectively.

Additional reading

- Lee, D. K., & Lee, E. S. (2016). Analyzing team based engineering design process in computer supported collaborative learning. *Eurasia Journal of Mathematics, Science & Technology Education*, 12(4), 767-782. doi:10.12973/eurasia.2016.1230a
- Ralston, P. S., Tretter, T. R., & Brown, M. K. (2017). Implementing Collaborative Learning across the Engineering Curriculum. *Journal of the Scholarship of Teaching and Learning*, 17(3), 89-108.